REMARKS

This application has been reviewed in light of the Final Office Action mailed on August 25, 2004. Claims 1-16 are pending in the application with Claims 1 and 9 being in independent form. By the present amendment, the specification and Claims 1, 2, 5-10 and 13-16 have been amended. No new matter or issues are believed to be introduced by the amendments.

Applicants gratefully acknowledge the time spent by the Examiner in reviewing Applicants' several sets of proposed claims and in providing Applicants' representative with comments and suggestions. Applicants also gratefully acknowledge the detailed analysis provided by the Examiner in the Final Office Action in analyzing and setting forth the similarities between the limitations recited by Applicants' pending claims and the teachings of the prior art.

It is brought to the Examiner's attention that the priority document for the subject application was filed in English on February 9, 2001 with the European Patent Office and assigned Application Number 01200494.1. A copy of the English filed priority document is submitted herewith.

In the Final Office Action, Claims 1, 7 and 9 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,370,118 issued to Vij et al. on December 6, 1994 ("Vij et al.").

Independent Claims 1 and 9 have been amended in a manner which is believed to better define Applicants' inventive configuration as shown by original Figures 4 and 7 and which overcome the rejection. Support for the amendments to Claims 1 and 9 can be found in the original specification and original Figures 4 and 7. Specifically, the original

specification in the detailed description section beginning at paragraph 30 of the published application and original Figures 4 and 7 respectively describe and show Applicants' inventive configuration as recited by Applicants' amended independent Claims 1 and 7. In particular, the claim language which recites "a switch of said at least one switch" pertains to switch 52 in Figures 4 and 7; the claim language which recites "a first set of the at least two RF coils" and "a second set of the at least two RF coils" pertains to RF coil pairs 9,12 and 10, 11 in Figure 4 and RF coil pairs 21, 22; 23, 24; 25, 26; and 27, 28 in Figure 7; the claim language which recites "wherein at least one selectively diverted first and second detected RF signal is combined with a respective detected RF signal" pertains to RF adder/combiner 53 in Figures 4 and 7; and the claim language which recites "selectively diverting said first and second detected RF signals along two different paths of at least four possible paths" pertains to switch 52 in Figures 4 and 7.

Claim 1 has been amended to recite "A magnetic resonance imaging apparatus comprising: an RF coil system comprising at least two sets of at least two RF coils which detect RF signals from a region of interest, at least two receiver channels which receive and process the detected RF signals, and a control unit which controls at least one switch that selectively routes a first and a second detected RF signal from a first set of the at least two RF coils towards separate receiver channels via different paths of at least two possible paths, where a switch of said at least one switch is positioned along each path of said at least two possible paths that selectively diverts said first and second detected RF signals along two different paths of at least four possible paths, wherein at least one selectively diverted first and second detected RF signal is combined with a respective

detected RF signal from a second set of the at least two RF coils selectively diverted by a different switch of said at least one switch along a particular path depending on the imaging parameters and forms combined signals, wherein the particular path includes a portion of one of said two different paths of said at least four possible paths, said control unit applies the combined RF signals to separate receiver channels." (Emphasis added) Claim 9 has been amended to recite similar recitations as the recitations added to Claim 1.

Vij et al. does not disclose or suggest at least the newly added limitations to Claims 1 and 9. Vij et al. is directed to a quadrature local coil which includes two coil sets placed on opposite sides of the patient, each coil set having a single loop and a split loop so as to be sensitive to quadrature components of a flux field centered between the coil sets. Figure 5 is a schematic diagram of the coils of the coil sets showing combining of the signals from each coil using combining networks 82 and 86.

Vij et al. does not disclose or suggest structure for selectively routing a first and a second detected RF signal from a first set of the two coils towards separate receiver channels via different paths of at least two possible paths where a switch is positioned along each path of the at least two possible paths for selectively diverting the first and second detected RF signals along two different paths of at least four possible paths, wherein at least one selectively diverted first and second detected RF signal is combined with a respective detected RF signal from a second set of the at least two coils selectively diverted by a different switch along a particular path depending on the imaging parameters to form combined signals, wherein the particular path includes a portion of one of the two different paths of the at least four possible paths, as recited by Applicants'

Claims 1 and 9. Accordingly, withdrawal of the rejection under 35 U.S.C. §102(b) and allowance of Claims 1 and 9 are respectfully requested.

Claim 7 depends from Claim 1 and Claim 15 depends from Claim 9, and therefore include the limitations of Claims 1 and 9, respectively. Accordingly, for the same reasons given for Claims 1 and 9, Claims 7 and 15 are believed to contain patentable subject matter. Accordingly, withdrawal of the rejection under 35 U.S.C. §102(b) and allowance of Claims 7 and 15 are respectfully requested.

Claims 1-7 and 9 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,377,044 issued to Burl et al. on April 23, 2002 ("Burl et al.").

Independent Claims 1 and 9 have been amended in a manner which is believed to better define Applicants' invention and to overcome the rejection. Claim 1 has been amended as shown above. Claim 9 has been amended to recite similar recitations as the recitations added to Claim 1.

Burl et al. does not disclose or suggest at least the newly added limitations to Claims 1 and 9. Burl et al. is directed to a magnetic resonance apparatus which includes a multi-mode receiver assembly which facilitates operation in both a quadrature combination mode and phased array mode. In the quadrature combination mode, two RF signals are combined to produce two signals; each of the two signals produced is applied to a separate receiver channel, i.e., either channel 1 or 2. Burl et al. also discloses that in a neck imaging application, at least one butterfly and one loop or ladder coil are combined in quadrature as a single channel. See col. 5, lines 37-39. Hence, Burl et al. suggests the use of a combiner, such as combiner 42, for performing this function. In the

phased array mode, two RF signals are not combined, but delayed with respect to each other and passed separately to the receiver channels. See col. 4, lines 43-59.

As discussed above with respect to Vij et al., Burl et al. also does not disclose or suggest structure for selectively routing a first and a second detected RF signal from a first set of the two coils towards separate receiver channels via different paths of at least two possible paths where a switch is positioned along each path of the at least two possible paths for selectively diverting the first and second detected RF signals along two different paths of at least four possible paths, wherein at least one selectively diverted first and second detected RF signal is combined with a respective detected RF signal from a second set of the at least two coils selectively diverted by a different switch along a particular path depending on the imaging parameters to form combined signals, wherein the particular path includes a portion of one of the two different paths of the at least four possible paths, as recited by Applicants' Claims 1 and 9. Accordingly, withdrawal of the rejection under 35 U.S.C. §102(e) and allowance of Claims 1 and 9 are respectfully requested.

Claims 2-7 depend from Claim 1, and therefore include the limitations of Claim 1. Accordingly, for the same reasons given for Claim 1, Claims 2-7 are believed to contain patentable subject matter. Accordingly, withdrawal of the rejection under 35 U.S.C. §102(e) and allowance of Claims 2-7 are respectfully requested.

Claims 1, 2, 4-6, 9, 10 and 12-14 were rejected under §102(e) as being anticipated by U.S. Patent No. 6,356,081 B1 issued to Misic on March 12, 2002 ("Misic").

Independent Claims 1 and 9 have been amended in a manner which is believed to better define Applicants' invention and to overcome the rejection. Claim 1 has been

amended as shown above. Claim 9 has been amended to recite similar recitations as the recitations added to Claim 1.

Misic does not disclose or suggest at least the newly added limitations to Claims 1 and 9. Misic is directed to a coil interface for coupling a phased array magnetic resonance imaging coil to a magnetic resonance imaging system. The coil interface includes a plurality of signal inputs and a plurality of output ports. Each of the output ports is associated with a receiver in the magnetic resonance imaging system. The coil interface also includes an interface circuit. The interface circuit selectively couples at least two of the signal inputs to at least one of the plurality of input ports. Where the coil is a quadrature phased array coil, in one embodiment, the two quadrature signals can be acquired as a single signal, precombined at the RF level within the coil interface, or as two separate RF signals by two of the receivers of the magnetic resonance imaging system hardware.

Misic does not disclose or suggest structure for selectively routing a first and a second detected RF signal from a first set of the two coils towards separate receiver channels via different paths of at least two possible paths where a switch is positioned along each path of the at least two possible paths for selectively diverting the first and second detected RF signals along two different paths of at least four possible paths, wherein at least one selectively diverted first and second detected RF signal is combined with a respective detected RF signal from a second set of the at least two coils selectively diverted by a different switch along a particular path depending on the imaging parameters to form combined signals, wherein the particular path includes a portion of one of the two different paths of the at least four possible paths, as recited by Applicants'

Claims 1 and 9. Accordingly, withdrawal of the rejection under 35 U.S.C. §102(e) and allowance of Claims 1 and 9 are respectfully requested.

Claims 2, 4-6, 9, 10 and 12-14 depend from either Claim 1 or Claim 9, and therefore include the limitations of Claims 1 or 9. Accordingly, for the same reasons given for Claims 1 and 9, Claims 2, 4-6, 9, 10 and 12-14 are believed to contain patentable subject matter. Accordingly, withdrawal of the rejection under 35 U.S.C. §102(e) and allowance of Claims 2, 4-6, 9, 10 and 12-14 are respectfully requested.

Claims 1-6 and 9-14 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S Patent No. 5,664,568 issued to Srinivasan et al. on September 9, 1997 ("Srinivasan et al.").

Independent Claims 1 and 9 have been amended in a manner which is believed to better define Applicants' invention and to overcome the rejection. Claim 1 has been amended as shown above. Claim 9 has been amended to recite similar recitations as the recitations added to Claim 1.

Srinivasan et al. does not disclose or suggest at least the newly added limitations to Claims 1 and 9. Srinivasan et al. is directed to a coil assembly 40 which includes a birdcage type head coil assembly 42 and a neck coil assembly 44. In paragraph 38 of the Office Action, the Examiner notes that Srinivasan et al. lacks directly showing that the interface and/or the sequence controller 60 "controls at least one switch." However, the Examiner notes that this features is suggested from Srinivasan et al., because Srinivasan et al. teaches that the coil has an MR interface, with the interface having "individual channel device drivers" with the images modes depending on whether the individual channels are "on" or "off".

However, Srinivasan et al. does not disclose or suggest structure for selectively routing a first and a second detected RF signal from a first set of the two coils towards separate receiver channels via different paths of at least two possible paths where a switch is positioned along each path of the at least two possible paths for selectively diverting the first and second detected RF signals along two different paths of at least four possible paths, wherein at least one selectively diverted first and second detected RF signal is combined with a respective detected RF signal from a second set of the at least two coils selectively diverted by a different switch along a particular path depending on the imaging parameters to form combined signals, wherein the particular path includes a portion of one of the two different paths of the at least four possible paths, as recited by Applicants' Claims 1 and 9. Accordingly, withdrawal of the rejection under 35 U.S.C. §103(a) and allowance of Claims 1 and 9 are respectfully requested.

Claims 2-6 and 10-14 depend from either Claim 1 or Claim 9, and therefore include the limitations of Claims 1 or 9. Accordingly, for the same reasons given for Claims 1 and 9, Claims 2-6 and 10-14 are believed to contain patentable subject matter. Accordingly, withdrawal of the rejection under 35 U.S.C. §103(a) and allowance of Claims 2-6 and 10-14 are respectfully requested.

Claims 8 and 16 were rejected under 35 U.S.C. §103(a) as being unpatentable over Burl et al. as applied to Claims 1-7 and 9 above, and further in view of Pruessmann et al., article titled, "SENSE: Sensitivity encoding for Fast MRI," Magnetic Resonance in Medicine, vol 42, pages 952-962, 1999 ("Pruessmann et al.").

Claims 8 and 16 depend from either Claim 1 or Claim 9, and therefore include the limitations of Claim 1 or 16. Accordingly, for the same reasons given for Claims 1 and 9,

Claims 8 and 16 are believed to contain patentable subject matter. Accordingly, withdrawal of the rejection under 35 U.S.C. §103(a) and allowance of Claims 8 and 16 are respectfully requested.

In view of the foregoing amendments and remarks, it is respectfully submitted that all claims presently pending in the application, namely, Claims 1-16, are believed to be in condition for allowance and patentably distinguishable over the art of record.

If the Examiner should have any questions concerning this communication or feels that an interview would be helpful, the Examiner is requested to call John Vodopia, Esq., Intellectual Property Counsel, Philips Electronics North America, at 914-333-9627.

Respectfully submitted,

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